

WHAT IS CLAIMED IS:

1. An apparatus for wrapping a load, comprising:
a dispenser for dispensing a film web;
means for rolling a portion of the film web into a cable; and
means for providing relative rotation between the load and the dispenser to wrap the film web around the load.
2. The apparatus of claim 1, further comprising means for driving at least a portion of the film web to an elevation below a top of a pallet supporting the load to be wrapped.
3. The apparatus of claim 1, wherein the means for rolling includes a guide roller and a cable rolling roper.
4. The apparatus of claim 3, wherein the guide roller is positioned such that its longitudinal axis is substantially perpendicular to a longitudinal axis of the cable rolling roper.
5. The apparatus of claim 3, wherein the cable rolling roper is a roller with a circumferential groove configured to receive an edge of the film web.
6. The apparatus of claim 5, wherein the groove is "V"-shaped.
7. The apparatus of claim 3, wherein the guide roller is coated with a cellular plastisol.
8. The apparatus of claim 7, wherein the cellular plastisol is porous.
9. An apparatus for wrapping a load, comprising:
a dispenser for dispensing a film web;
at least one guide roller; and

a cable rolling roper configured to roll a portion of the film web into a cable, the roper being positioned adjacent to the at least one guide roller.

10. The apparatus of claim 9, wherein the cable rolling roper is configured to roll a top portion of the film web.

11. The apparatus of claim 9, wherein the cable rolling roper is configured to roll a bottom portion of the film web.

12. The apparatus of claim 9, further comprising a second cable rolling roper.

13. The apparatus of claim 12, wherein one of the cable rolling ropers is configured to roll a bottom portion of the film web and the other cable rolling roper is configured to roll a top portion of the film web.

14. The apparatus of claim 9, further including a second guide roller.

15. The apparatus of claim 14, wherein the second guide roller is positioned downstream from the cable rolling roper.

16. The apparatus of claim 14, wherein the second guide roller is configured to diagonally bias at least a portion of the film web.

17. The apparatus of claim 14, wherein the second guide roller is configured to drive at least a portion of the film web to an elevation below a top of a pallet supporting the load to be wrapped.

18. The apparatus of claim 9, wherein the guide roller is coated with a porous, cellular plastisol.

19. The apparatus of claim 9, further including means for providing relative rotation between the load and the dispenser.

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

20. An apparatus for wrapping a load, comprising:
- a dispenser for dispensing a film web;
 - a first guide roller configured to engage at least a portion of a width of the film web;
 - at least one roping element; and
 - a second guide roller configured to engage at least a portion of the width of the film web, the second guide roller being selectively movable between an engaged position and an unengaged position.
21. The apparatus of claim 20, wherein the first guide roller is coated with a cellular plastic.
22. The apparatus of claim 20, wherein the at least one roping element is a cable rolling roper configured to roll a portion of the film web into a cable.
23. The apparatus of claim 22, wherein the cable rolling roper is a roller and includes a circumferential groove for receiving and rolling an edge of the film web.
24. The apparatus of claim 20, further comprising means for providing relative rotation between the load and the dispenser.
25. The apparatus of claim 24, wherein the means for providing relative rotation includes a rotatable arm.
26. The apparatus of claim 24, wherein the means for providing relative rotation includes a turntable.
27. The apparatus of claim 22, wherein the cable rolling roper is positioned to roll a top portion of the film web into a cable.

28. The apparatus of claim 22, wherein the cable rolling roper is positioned to roll a bottom portion of the film web into a cable.

29. The apparatus of claim 20, wherein the at least one roping element is positioned downstream of the first guide roller.

30. The apparatus of claim 20, further comprising two roping elements.

31. The apparatus of claim 30, wherein a first roping element is positioned downstream of and adjacent to the first guide roller and wherein a second roping element is positioned downstream of and adjacent to the second guide roller.

32. The apparatus of claim 31, wherein the second guide roller is downstream of the first guide roller.

33. The apparatus of claim 20, wherein at least one of the first and second guide rollers are tiltable to bias the film web.

34. The apparatus of claim 20, wherein at least one of the first and second guide rollers are tiltable to drive a portion of the film web to an elevation below a top of a pallet supporting the load.

35. An apparatus for wrapping a load, comprising:
a dispenser for dispensing a film web;
at least one roping element; and
means for driving at least a portion of the film web to an elevation below a top of a pallet supporting the load, the means for driving the film web including at least one selectively engageable roller positionable to engage a width of the film web.

36. The apparatus of claim 35, wherein when in an engaged position, the at least one roller is positioned such that the film web initially engages the at least one roller at a first elevation and leaves the at least one roller at a second, lower elevation.

37. The apparatus of claim 35, further including means for providing relative rotation between the load and the dispenser.

38. The apparatus of claim 35, wherein the at least one roping element is a cable rolling roper.

39. An apparatus for wrapping a load, comprising:
a dispenser for dispensing a film web;
means for driving a portion of the film web to an elevation below a top of a pallet supporting the load;
at least one roping element; and
means for biasing a portion of the film web to narrow its width.

40. The apparatus of claim 39, further comprising means for providing relative rotation between the load and the dispenser.

41. The apparatus of claim 39, wherein the means for driving a portion of the film web includes a coated guide roller.

42. The apparatus of claim 41, wherein the guide coated roller is selectively tiltable.

43. The apparatus of claim 42, wherein the coated guide roller is coated with a porous cellular plastic.

44. The apparatus of claim 39, wherein the means for biasing includes a uncoated guide roller.

45. The apparatus of claim 44, wherein the uncoated guide roller is selectively movable between an engaged position and an unengaged position.

46. The apparatus of claim 45, wherein the uncoated guide roller is movable between the engaged position and the unengaged position by engagement and disengagement, respectively, of the dispenser with a lever connected to the uncoated guide roller.

47. The apparatus of claim 39, wherein the at least one roping element is a cable rolling roper.

48. The apparatus of claim 47, wherein the cable rolling roper is a roller configured to roll a portion of the film web into a cable.

50. A method for wrapping a load, comprising:
dispensing a film web from a film dispenser;
rolling a portion of the film web into a cable; and
providing relative rotation between the load and the dispenser to wrap the film web around the load.

51. The method of claim 50, wherein wrapping the film web around the load includes securing the load to a pallet supporting the load with the film web and cable.

52. The method of claim 50, further comprising driving a portion of the film web to an elevation below a top of a pallet supporting the load.

53. The method of claim 82, wherein driving a portion of the film web includes engaging the film web with a guide roller.

54. The method of claim 53, wherein the roller is coated.

55. The method of claim 50, wherein rolling a portion of the film web includes engaging an edge portion of the film web with a cable rolling roper.

56. The method of claim 55, wherein engaging the edge portion of the film web includes engaging the edge portion with a circumferential groove in a roller forming the cable rolling roper.

57. The method of claim 55, wherein rolling the portion of the film web further includes engaging at least a portion of the film web with a guide roller.

58. The method of claim 88, wherein engaging at least a portion of the film web with a guide roller includes engaging with a guide roller coated with a cellular plastic.

59. A method for securing a load to a pallet with a film web, comprising:
dispensing a film web from a dispenser; and

rolling a portion of the film web into a rolled cable, wherein rolling a portion of the film web includes engaging a width of the film web with a guide roller and engaging at least an edge portion of the film web with a cable rolling roper positioned adjacent to the guide roller.

60. The method of claim 59, further comprising providing relative rotation between the load and the dispenser to wrap the film web and rolled cable around the load.

61. The method of claim 60, wherein wrapping the film web and rolled cable around the load includes securing at least a portion of the load to at least a portion of a pallet supporting the load.

62. The method of claim 61, wherein securing at least a portion of the load to at least a portion of a pallet supporting the load includes wrapping the cable around the pallet below a top portion of the pallet that supports the load.

63. The method of claim 59, further comprising driving a portion of the film web to an elevation below a top of a pallet supporting the load.

64. A method for securing a load to a pallet with a film web, comprising:
dispensing a film web from a dispenser;
engaging a portion of the film web with a roping element; and
driving a portion of the film web downward to an elevation below a top of a pallet supporting the load.

65. The method of claim 64, further comprising providing relative rotation between the load and the dispenser to wrap the film web around the load.

66. The method of claim 65, wherein wrapping the film web around the load includes securing the load to the pallet with the film web and a roped portion of the film web.

67. The method of claim 66, wherein securing the load to the pallet with the film web and a roped portion of the film web includes wrapping the roped portion of the film web below the top of the pallet supporting the load.

68. The method of claim 64, wherein engaging a portion of the film web with a roping element includes rolling a portion of the film web into a rolled cable of film.

69. The method of claim 64, wherein engaging a portion of the film web with a roping element includes one of gathering, compacting, and compressing a portion of the film web into a rope of film.

70. The method of claim 64, wherein driving the film web downward includes engaging a width of the film web with a guide roller.

71. The method of claim 64, wherein driving the film web downward includes engaging at least a portion of a width of the film web with first and second guide rollers.

72. The method of claim 71, wherein the first guide roller is coated and the second guide roller is uncoated.

73. A method for securing a load to a pallet with a film web, comprising:
dispensing a film web from a dispenser;
driving a portion of the film web downward to a first elevation below a film dispensing elevation;
roping a portion of the film web into a rope of film; and
driving the portion of the film web and cable downward to a second elevation below the film dispensing elevation.

74. The method of claim 73, wherein roping a portion of the film web includes rolling a portion of the film web into a rolled cable of film.

75. The method of claim 74, further comprising providing relative rotation between the load and the dispenser to secure the load to the pallet with the film web and cable of film.

76. The method of claim 75, wherein securing the load to the pallet includes wrapping the cable around the pallet above fork holes in a lower portion of the pallet.

77. The method of claim 73, wherein driving the film web downward to the first elevation includes engaging at least a portion of the width of the film web with a first guide roller.

78. The method of claim 77, wherein driving the film web downward to the second elevation includes selectively engaging at least a portion of the width of the film web with a second guide roller.

79. A method for securing a load to a pallet with a film web, comprising:
dispensing a film web from a dispenser;
roping a portion of the film web into a roped portion; and
biasing a portion of the film web to narrow its width.

80. The method of claim 79, wherein roping a portion of the film web includes rolling a portion of the film web into a rolled cable.

81. The method of claim 79, wherein biasing a portion of the film web includes stretching a portion of the film web along a diagonal.

82. The method of claim 81, wherein stretching the film web along a diagonal includes selectively engaging at least a portion of a width of the film web with a guide roller.

83. The method of claim 82, wherein selectively engaging the film web with the guide roller includes placing the guide roller in an engaged position.

84. The method of claim 83, wherein placing the guide roller in an engaged position includes engaging a lever connected to the guide roller with the dispenser.

85. The method of claim 84, further comprising disengaging the dispenser from the lever to move the guide roller to a disengaged position.

86. A method for securing a load to a pallet with a film web, comprising:

dispensing a film web from a dispenser;

engaging at least a portion of a width of the film web with at least one roller at a first elevation;

disengaging the film web from the at least one roller at a second elevation, wherein the second elevation is lower than the first elevation;

rolling a portion of the film web into a rolled cable; and

providing relative rotation between the load and the dispenser to secure the load to the pallet with the film web and cable.

87. A method for securing a load to a pallet with a film web, comprising:

dispensing a film web from a dispenser;

engaging at least a portion of a width of the film web with at least one roller at a first elevation;

disengaging the film web from the at least one roller at a second elevation, wherein the second elevation is lower than the first elevation;

roping a portion of the film web into roped portion; and

providing relative rotation between the load and the dispenser to secure the load to the pallet with the film web and cable.

88. A method of securing a load to a pallet with a film web, comprising:
dispensing a film web from a film dispenser;
driving the film web to an elevation below a top of a pallet supporting the load;
rolling a portion of the film web into a cable; and
wrapping the cable around the pallet to secure the load to the pallet with the film web.

89. An apparatus for securing a load to a pallet with a film web, comprising:
a dispenser for dispensing a film web;
means for driving the film web to an elevation below a top of the pallet supporting the load, the means for driving including at least one roller selectively positionable to engage a width of the film web;
means for roping a portion of the film web into a rope; and
means for providing relative rotation between the load and the dispenser.

90. The apparatus of claim 89, wherein the means for roping includes means for rolling the portion of the film web into a rolled cable.

91. An apparatus for securing a load to a pallet with a film web, comprising:
a dispenser for dispensing a film web;

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER ^{LLP}

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

means for driving the film web to an elevation below a top of the pallet supporting the load, the means for driving including at least one selectively engageable roller, the roller being angled relative to a film feed direction; at least one roping element; and means for providing relative rotation between the load and the dispenser.

92. An apparatus for securing a load to a pallet with a film web, comprising:

a dispenser for dispensing a film web; means for driving the film web to an elevation below a top of the pallet supporting the load, the means for driving including a first roller angled with respect to a film feed direction and a second roller angled with respect to the film feed direction, wherein the first and second rollers are tilted in substantially opposite directions; at least one roping element; and means for providing relative rotation between the load and the dispenser.

93. An apparatus for wrapping a load, comprising:

a dispenser for dispensing a film web; a first roller angled to engage a film path between the dispenser and the load; a second roller selectively engagable with the film path; means for rolling a portion of the film web into a cable; and

means for providing relative rotation between the load and the dispenser.

94. A method of wrapping a load, comprising:
dispensing a film web from a dispenser;
selectively engaging at least a portion of a width of the film web with a roller angled with respect to a film feed direction;
driving at least a portion of the film web to an elevation below a top of the pallet supporting the load;
rolling a portion of the film web into a cable; and
providing relative rotation between the dispenser and the load to wrap the film web and cable around at least a portion of the load and pallet.

95. A method for securing a load to a pallet with a film web, comprising:
dispensing a film web from a dispenser;
moving a roller into engagement with a film path between the dispenser and the load, wherein the roller is angled with respect to a film feed direction;
moving the roller out of engagement with the film path;
rolling a portion of the film web into a cable; and
providing relative rotation between the dispenser and the load to wrap the load and at least a top portion of the pallet with the film web and cable.

96. A method for wrapping a load, comprising:
dispensing a film web from a dispenser;

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

engaging a selectively engageable roller at a first elevation with the film web;

removing the film web from the selectively engageable roller at a second elevation that is lower than the first elevation;

roping a portion of the film web into a rope; and

providing relative rotation between the dispenser and the load to wrap at least a bottom portion of the load and at least a top portion of the pallet with the film web and rope.

97. An apparatus for wrapping a load, comprising:

a dispenser for dispensing a film web;

means for biasing the film web to reduce its width, the means for biasing including a tilted roller;

means for rolling a portion of the film web into a cable; and

means for providing relative rotation between the dispenser and the load to wrap the cable and at least a portion of the film web around a top portion of the pallet and a bottom portion of the load.

98. An apparatus for wrapping a load, comprising:

a dispenser for dispensing a film web;

means for driving a portion of the film web to an elevation below a top of a pallet supporting the load, the means for driving including a first guide roller;

means for biasing the film web to reduce its width, the means for biasing including a second guide roller;

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

means for roping a portion of the film web, the means for roping including at least one roping element configured to engage an edge portion of the film web; and

means for providing relative rotation between the dispenser and the load to wrap the roped film and at least a portion of the biased film web around a top portion of the pallet and a bottom portion of the load.

99. A method for securing a load to a pallet with a film web, comprising:

dispensing a film web from a dispenser;

engaging a width of the film web with a first guide roller to drive the film web to an elevation below a top of a pallet supporting the load;

engaging at least a portion of the width of the film web with a second guide roller to bias the film web to reduce its width;

engaging an edge portion of the film web with a roping element to rope a portion of the film web; and

providing relative rotation between the dispenser and the load to wrap the cable and at least a portion of the biased film web around a top portion of the pallet and a bottom portion of the load.

100. The method of claim 99, wherein roping a portion of the film web includes rolling a portion of the film web into a rolled cable of film.

101. A wrapping apparatus for wrapping a palletized load, comprising:

a dispenser for dispensing a film web;

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

film driving means for driving the film web to an elevation below a top of the pallet supporting the load, the film driving means including at least one roller selectively positionable to engage a width of the film web; and

means for providing relative rotation between the load and the dispenser.

102. The apparatus of claim 101, wherein the at least one roller is angled relative to a film feed direction.

103. The apparatus of claim 102, wherein the at least one roller is movable between an engaged position, where the at least one roller engages the dispensed film, and a disengaged position, where the at least one roller does not engage the dispensed film.

104. The apparatus of claim 103, wherein the dispenser is movably mounted on a vertical structure, and wherein the at least one roller is positionable in the engaged position when the dispenser is at a lowermost point on the vertical structure.

105. The apparatus of claim 103, wherein the dispenser is movably mounted on a vertical structure, and wherein the at least one roller is positionable in the engaged position when the dispenser is above a lowermost point on the vertical structure.

106. The apparatus of claim 101, wherein the at least one roller is tilted at an angle that permits the film web to engage a surface of the roller.

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER ^{LLP}

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

107. The apparatus of claim 106, wherein the roller has a surface of 360 degrees, and wherein the amount of roller surface engageable by the film web is between about 45 degrees and about 135 degrees.

108. The apparatus of claim 101, wherein at top of the at least one roller is angled in a direction perpendicular to a radius of a center of rotation.

109. The apparatus of claim 101, wherein the film driving means includes a lever connected to the at least one roller.

110. The apparatus of claim 109, wherein the lever moves the at least one roller between an engaged position and a disengaged position.

111. The apparatus of claim 110, wherein the lever is connected to the dispenser.

112. The apparatus of claim 1, further comprising at least one roping element.

113. The apparatus of claim 112, wherein the at least one roping element includes a cable rolling roper configured to roll a portion of the film web into a rolled cable.

114. The apparatus of claim 112, wherein the at least one roping element is positioned on a downstream side of the at least one roller.

115. The apparatus of claim 21, wherein the at least one roping element is positioned immediately adjacent the at least one roller.

116. The apparatus of claim 112, further comprising two roping elements.

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

117. The apparatus of claim 116, wherein a first roping element is positioned on a downstream side of the at least one roller and wherein a second roping element is positioned on a downstream side of the second roller.

118. A wrapping apparatus for wrapping a palletized load, comprising:

a dispenser for dispensing a film web;

at least one bar tilted to selectively engage a film path between the dispenser and the load, the at least one bar being connected to a mechanical link, wherein the at least one bar is actuatable by engagement of the link with the dispenser; and

means for providing relative rotation between the load and the dispenser.

119. An apparatus for wrapping a load, comprising:

a dispenser for dispensing a film web;

a cable rolling roper configured to engage an edge of the film web and roll it into a rolled cable of film; and

means for providing relative rotation between the load and the dispenser to wrap the film web around the load.